Remarks

Entry of the amendments presented, reconsideration of the application and allowance of all pending claims are respectfully requested. Upon entrance of this amendment, claims 1-15, 24-38 & 47-54 will be pending.

In accordance with 37 C.F.R. 1.121(c)(1)(ii), a marked-up version of the amended claims is provided on one or more pages separate from the amendment. These pages are appended to the end of the Response.

This paper represents applicants' first opportunity to comment on the new combination of patents cited in the final Office Action. Consideration of the amendments and remarks submitted herewith is therefore respectfully requested.

By this amendment, each remaining independent claim (i.e., claims 1, 24 & 47-50) is amended to recite routing of messages to multiple clients of the network. Support for this amendment can be found throughout the application. Further, independent claims 48 & 50 are amended to indicate that the routing of the message by the one or more routers is based on data content of the message irrespective of any destination information that may be within the message. Support for this amendment can also be found throughout the application as filed, for example, reference the remaining independent claims 1, 24, 47 & 49. Further, claims 51 & 53 add characterizations regarding the routing of the message to multiple clients being resilient to router failure within a network without loss of the message, while new claims 52 and 54 add the characterization that the routing is resilient to multiple concurrent router or link failures within the network without loss of the message. Support for these later claims can be found throughout the application, for example, reference page 4, lines 14-20. These amendments to the claims and new claims constitute a bona fide attempt by applicants to advance prosecution of this application and obtain allowance of certain claims, and are in no way meant to acquiesce to the substance of the final rejection. No new matter is believed added to the application by any amendment presented.

In the Office Action, claims 1-15, 24-38, 47 & 49 were rejected under 35 U.S.C. §103(a) as being unpatentable over Chandra et al. (U.S. Patent No. 6,091,724) in view of Doshi et al. (U.S. Patent No. 5,222,061); while claims 16-23, 39-46, 48 & 50 were rejected under 35 U.S.C. §103(a) as being unpatentable over Doshi et al. in view of Drottar (U.S. Patent No. 6,343,067 B1). Each of these rejections is respectfully, but most strenuously, traversed and reconsideration thereof is requested. In accordance with this amendment, claims 16-23 & 39-46 are canceled without prejudice, with the subject matter thereof being well covered by the remaining claims. In addition, independent claims 48 & 50 are amended to recite a system and article of manufacture, respectively, corresponding with that recited in claims 47 & 49. In view of these amendments, the second rejection based upon Doshi et al. in view of Drottar is believed moot.

With respect to the first rejection, applicants respectfully submit that a prima facie case of obviousness is not stated in the Office Action based upon Chandra et al. in view of Doshi et al. At page 3 of the Office Action, it is noted that Chandra et al. do not disclose being resilient to router or link failure within the network. Doshi et al. is allegedly being cited for a teaching of this aspect of applicants' invention. However, in the second rejection beginning at pages 8 & 9 of the Office Action, it is pointed out that Drottar et al. is being cited for teaching resiliency to router or link failure within the network, thereby implying that Doshi et al. do not teach this feature of applicants invention. Based upon this inconsistency, applicants respectfully submit that a prima facie case of obviousness is lacking in the Office Action relative to claims 1-15, 24-38, 47 & 49 based upon Chandra et al. in view of Doshi et al. That is, based upon the Office Action's own admission at pages 8 & 9, Doshi et al. do not teach an aspect of applicants' claimed invention, which the Office Action also recognizes Chandra et al. do not teach. For this reason alone, reconsideration and withdrawal of the final Office Action is respectfully requested.

Independent claims 1, 24 & 47-50 each recite a technique for routing messages within a network environment. The technique includes, in part, receiving a message into the network and then routing the message to multiple clients of the network. The routing is accomplished based on data content of the message irrespective of any destination information that may be within the

message. Further, the routing is resilient to router or link failure within the network and is accomplished without loss of the message. Based on these characterizations, applicants respectfully submit that the independent claims, as well as the dependent claims which depend therefrom, patentably distinguish over the teachings and suggestions of the applied patents.

Chandra et al. describe routing of messages within a network using the data content of the message. The router does not need any destination information from the message, and thus, the message does not need to include any destination information. Instead, the router uses an automated search data structure to determine which links correspond to consumers interested in receiving the message. The message is sent only over those links.

As noted in the Office Action, Chandra et al. do not disclose routing of messages within a network wherein the routing is resilient to router or link failure within the network. For a teaching of this concept, the Office Action appears to rely upon Doshi et al., at least at pages 3 & 4 of the Office Action.

Doshi et al. describe a data services retransmission procedure wherein control is achieved by tracking in a list the sequence numbers of transmitted data packets and retransmitting a data packet only if its sequence number appears in the list prior to the sequence number of the last data packet that is received correctly by a receiver. As shown in FIG. 1, a transmitter 100 transmits data packets to a receiver 200. A logical link control layer is provided to define a number of functions for interfacing a data terminal with another data terminal via a communications path for the purpose of exchanging data packets. Periodically, receiver 200 sends transmitter 100 a status control message indicating, inter alia, which packets were received correctly and not correctly (or not at all). An example of this status control message is shown in FIG. 3. For example, the error check field contains a conventional error check code that permits a transmitter to determine whether or not the status control message contains an error. Doshi et al. is an example of a point-to-point communication, wherein the transmitter is aware of and needs to know the identity of the receiver.

Applicants respectfully submit that a careful reading of Doshi et al. fails to uncover the recited concept of routing a message to multiple clients of a network, wherein the routing is based on data content of the message irrespective of any destination information that may be within the message, and wherein the routing is resilient to router or link failure within the network without loss of the message. Doshi et al. describe a point-to-point reliability method, wherein the transmitter knows the receiver, and the receiver must return a status control message indicating which packets were received correctly or not correctly. Based on this information, the transmitter then has the capability of retransmitting any incorrectly received packet. This point-to-point reliability method simply is not applicable to the environment of applicants' claimed invention, that is, the routing of messages to multiple clients of the network wherein the routing is based on data content of the message, and not any destination information that may be within the message. In applicants' invention, the sender of the information does not know the number or location of the receivers. Without this information, the retransmission procedure of Doshi et al. would be incapable of functioning. For example, Doshi et al. would not know when it is okay to release a packet since they would not know when or if a packet was actually received.

Notwithstanding the above, if one were to attempt to combine the teachings of Doshi et al. with those of Chandra et al., it would be necessary to determine how many receivers of the message there are. However, neither Chandra et al. nor Doshi et al. teach, suggest or imply how the number of clients could be determined in an environment such as recited by applicants wherein the routing to the multiple clients is based on data content of the message itself, and not any destination information associated with the message. Thus, since Doshi et al. teach a point-to-point routing or retransmission procedure, and since there is no suggestion or implication in either Doshi et al. or Chandra et al. to expand that teaching to a point to multiple point routing, nor is there any teaching or suggestion in Chandra et al. or Doshi et al. for identifying the multiple receivers in an environment such as recited by applicants, it is respectfully submitted that applicants' claimed invention would not have been obvious to one of ordinary skill in the art based on the teachings of Chandra et al. or Doshi et al., either alone or in combination.

For all the above reasons, applicants respectfully request reconsideration and withdrawal of the obviousness rejection to the independent claims presented herewith based upon Chandra et al. in view of Doshi et al. The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations.

For example, neither Chandra et al. nor Doshi et al. teach, suggest or imply all or nothing routing such as recited by applicants in claims 2 & 26. Further, applicants recite logging a message to at least one logging node within the network before delivering the message to the multiple clients in the network. This logging includes storing the message in persistent storage. Neither Chandra et al. nor Doshi et al. teach or suggest storing a message to persistent storage prior to delivery thereof. Note that the buffers described by Doshi et al. are by definition volatile memory and do not qualify as persistent storage as the term is understood in the art. New claims 51 & 53 further characterize the routing of the message as being specifically resilient to router failure within the network without loss of the message. Since the Office Action equates the transmitter with the router, if the transmitter were to go down in Doshi et al., there is no suggestion or implication how the messages could be retrieved. Again, the message storage in Doshi et al. is in volatile memory and would not survive a transmitter failure. New claims 52 and 54 further recite that the routing of the message to the multiple clients is resilient to multiple concurrent router or link failures within the network without loss of the message. A careful reading of Doshi et al. fails to uncover any suggestion or implication that the point-to-point retransmission technique described therein could withstand multiple router or link failures.

For all the above reasons, applicants respectfully submit that the claims presented herewith patentably distinguish over the applied art. In this regard, applicants note that the Drottar et al. patent, although not cited against the independent claims at issue, is merely another example of point-to-point failure and recovery in a computer network. The teachings of this patent simply would not apply to an environment such as recited by applicants wherein the message is routed to multiple clients, and the routing is based on data content of the message itself, rather than any destination information associated with the message. Since the number of

clients is unknown at the time of routing, the Drottar et al. teachings would not be applicable, nor extendable, to applicants' claimed invention.

In view of the above, applicants respectfully request reconsideration and withdrawal of all rejections pending in the application.

If the Examiner wishes to discuss this application further, the Examiner is invited to telephone applicants' below-listed representative. The application is believed to be in condition for allowance and such action is respectfully requested.

Respectfully submitted,

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Version With Markings To Show Changes Made

In the Claims:

Claims 16-23 & 39-46 are canceled herein without prejudice.

Claims 1, 4, 5, 10, 11, 13-15, 24, 28, 29, 32-35, 37, 38 & 47-50 are amended and new claims 51-54 are added as set forth below.

1. (Twice Amended) A method for routing messages within a network, said method comprising:

receiving a message; and

routing said message to multiple ~~one or more~~ clients of said network, said routing being based on data content of said message irrespective of any destination information that may be within said message, and being resilient to router or link failure within said network without loss of said message.

4. (Amended) The method of claim 1, wherein said routing comprises logging said message at at least one logging node within said network before delivering said message to said multiple ~~one or more~~ clients of said network, said logging comprising storing said message in persistent storage.

5. (Amended) The method of claim 4, further comprising subsequent to said logging of said message, sending a logging acknowledgment to at least one router of said network routing said message, and upon receipt of said logging acknowledgment at said at least one router, delivering said message to a client thereof, said client requiring uniform delivery and comprising one client of said multiple ~~one or more~~ clients.

10. (Amended) The method of claim 1, wherein said network comprises a spanning tree having a plurality of routers, said method further comprising detecting failure of a router within said tree before completing routing of said message to said multiple ~~one or more~~ clients of said network, reconfiguring said tree to replace said failed router with a new router, and automatically generating a request for retransmission of said message.

11. (Amended) The method of claim 10, further comprising prior to said detecting of said failure, logging said message within persistent storage of said network and issuing a logging acknowledgment confirming storage of said message to at least one router of said tree through which said message is routed to said multiple ~~one or more~~ clients.

13. (Amended) The method of claim 1, wherein said routing further comprises determining within said network whether said message comprises a duplicate message to said multiple ~~one or more~~ clients of said network, and if so, aborting said duplicate message such that said message is delivered to said multiple ~~one or more~~ clients at most once.

14. (Twice Amended) The method of claim 1, further comprising automatically informing a sender of said message when the message has not been received by the network to allow the sender to retransmit said message to the network for routing to said multiple ~~one or more~~ clients of said network so that said message is delivered at least once to said multiple ~~one or more~~ clients.

15. (Amended) The method of claim 1, wherein said routing comprises logging said message at at least one logging node within said network before delivering said message to said multiple ~~one or more~~ clients of said network, said logging comprising storing said message into persistent storage, and wherein said method further comprises subsequent to said logging of said message, sending a logging acknowledgment to at least one router of said network routing said message, and upon receipt of said logging acknowledgment at said at least one router of said network routing said message, looking up routing information for said message from a message table maintained at said at least one router, then sending said logging acknowledgment across said network using said looked up routing information, and thereafter deleting said routing information from said message table.

16. Canceled.

17. Canceled.

18. Canceled.

19. Canceled.

20. Canceled.

21. Canceled.

22. Canceled.

23. Canceled.

24. (Twice Amended) A system of routing messages within a network, said system comprising:

means for receiving a message; and

means for routing said message to multiple ~~one or more~~ clients of said network, said routing being based on data content of said message irrespective of any destination information that may be within said message, and wherein said means for routing is resilient to router or link failure within said network without loss of said message.

28. (Amended) The system of claim 24, wherein said means for routing comprises means for logging said message to at least one logging node within said network before delivering said message to said multiple ~~one or more~~ clients of said network, said means for logging comprising means for storing said message in persistent storage.

29. (Amended) The system of claim 28, further comprising means for sending a logging acknowledgment to at least one router of said network routing said message after said means for logging stores said message in persistent storage, and wherein said system further comprises, at said at least one router of said network routing said message, means for delivering said message to a client thereof upon receipt of said logging acknowledgment, said client requiring uniform delivery and comprising one client of said multiple ~~one or more~~ clients.

32. (Amended) The system of claim 24, wherein said network comprises a spanning tree and wherein said system further comprises a logger node within said spanning tree for

logging said message to persistent storage during routing of said message to said multiple ~~one or more~~ clients of said network.

33. (Amended) The system of claim 24, wherein said means for routing comprises means for employing said logger node to log said message to persistent storage to ensure a uniform delivery quality of service of said message to said multiple ~~one or more~~ clients of said network notwithstanding failure of one or more routers or links within said network.

34. (Amended) The system of claim 24, wherein said network comprises a spanning tree having a plurality of routers, and further comprising means for detecting failure of a router within said tree before completing routing of said message to said multiple ~~one or more~~ clients of said network, and means for reconfiguring said tree to replace said failed router with a new router, and means for automatically generating a request for retransmission of said message.

35. (Amended) The system of claim 34, further comprising means for logging said message within persistent storage of said network and for issuing a logging acknowledgment confirming storage of said message to at least one router of said tree through which said message is routed to said multiple ~~one or more~~ clients.

37. (Amended) The system of claim 24, wherein said means for routing further comprises means for determining within said network whether said message comprises a duplicate message to said multiple ~~one or more~~ clients of said network, and if so, for aborting said duplicate message such that said message is delivered to said multiple ~~one or more~~ clients at most once.

38. (Twice Amended) The system of claim 24, further comprising means for automatically informing a sender of said message when said message has not been received by the network to allow the sender to retransmit said message to the network for routing to said multiple ~~one or more~~ clients of said network so that said message is delivered at least once to said multiple ~~one or more~~ clients.

39. Canceled.

40. Canceled.

41. Canceled.

42. Canceled.

43. Canceled.

44. Canceled.

45. Canceled.

46. Canceled.

47. (Twice Amended) A system for routing messages comprising:

a network adapted to receive and log a message to persistent storage; and

said network comprising one or more routers adapted to route said message to multiple ~~one or more~~ clients of said network, wherein said routing of said message by said one or more routers is based on data content of said message irrespective of any destination information that may be within the message, and is resilient to router or link failure within the network without loss of said message.

48. (Twice Amended) A system for routing messages comprising:

a network adapted to receive a message;

a logger node within said network for logging said message to persistent storage; and

said network comprising one or more routers for delivering said message to multiple ~~one or more~~ clients of said network, wherein said routing of said message by said one or more routers is based on data content of said message irrespective of any

destination information that may be within the message, and wherein said logging of said message to persistent storage occurs prior to delivery of said message to said multiple ~~one or more~~ clients of said network, thereby providing resiliency of said routing without loss of said message notwithstanding router or link failure within said network.

49. (Twice Amended) An article of manufacture, comprising:

at least one computer usable medium having computer readable program code means embodied therein for effecting routing of messages within a network, the computer readable program code means in the article of manufacture comprising:

computer readable program code means for causing a computer to effect receiving a message; and

computer readable program code means for causing a computer to effect routing said message to multiple ~~one or more~~ clients of said network, said routing being based on data content of said message and being resilient to router or link failure within said network without loss of said message.

50. (Twice Amended) An article of manufacture, comprising:

at least one computer usable medium having computer readable program code means embodied therein for effecting routing of messages within a routing network, the computer readable program code means in the article of manufacture comprising:

computer readable program code means for causing a computer to effect receiving a message;

computer readable program code means for causing a computer to effect logging said message to persistent storage within the routing network; and

computer readable program code means for causing a computer to effect delivering said message to multiple ~~one or more~~ clients of said network after said logging thereof, wherein said routing is based on data content of said message

irrespective of any destination information that may be within said message, and wherein said logging to persistent storage prior to delivery of said message to said multiple ~~one or more~~ clients of said network provides resiliency of said routing without loss of said message notwithstanding router or link failure within said network.

51. (New) The method of claim 1, wherein said routing of said message to multiple clients of said network is resilient to router failure within said network without loss of said message.

52. (New) The method of claim 1, wherein said routing of said message to multiple clients of said network is resilient to multiple concurrent router or link failures within said network without loss of said message.

53. (New) The system of claim 24, wherein said means for routing is resilient to router failure within said network without loss of said message.

54. (New) The system of claim 24, wherein said means for routing is resilient to multiple concurrent router or link failures within said network without loss of said message.

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